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10/586,134	07/17/2006	Kathrin Michl	293255US0PCT	3815
22850 7590 01/27/2010 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER REDDY, KARUNA P				
ART UNIT 1796		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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# Office Action Summary

## Application No.

10/586,134

## Applicant(s)

MICHL ET AL.

## Examiner

KARUNA P. REDDY

## Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 10, 11, 13-18 and 20-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-11, 13-18 and 20-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. This office action is in response to amendment filed 10/21/2009. Claims 1-9, 12 and 19 are cancelled; claims 10, 15, 23-26 are amended. Accordingly, claims 10-11, 13-18, 20-27 are currently pending in the application.

This action is made final in light of limitations to the claims that are newly presented following the preceding office action.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claim Rejections - 35 USC § 112***

3. Claims 10-11, 13-18, 20-27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 10 (line 10) and claim 25 (lines 4-5) recites "free radically polymerizable unsaturated group". While there is support for "free radically polymerizable double bonds", there is no support for the broad "unsaturated group" in the originally filed claims and specification.

Claims 11, 13-18 and 20-27 are subsumed by this rejection because of their dependence either directly or indirectly on claims 10 or 25.

***Claim Rejections - 35 USC § 103***

4. Claims 10-11, 13-14 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arkens et al (US 5, 661, 213).

Arkens et al disclose aqueous coating composition containing polyacid and a polyol. The composition may be used as a binder for heat resistant nonwovens such as fiber glass (abstract). The addition polymer must contain at least two carboxylic acid groups such as (meth)acrylic acid, anhydride groups or salts thereof (column 4, lines 1-2). The addition polymer containing at least two carboxylic acid groups may have a molecular weight preferably from about 10,000 to 100,000 (column 4, lines 28-29) and reads on multifunctional macromonomer of instant claims. The polymerization reaction may be initiated by using the thermal decomposition of an initiator to generate free radicals to effect polymerization (column 5, lines 6-11).

The curable aqueous composition may be used as a binder for heat resistant nonwoven fabrics such as certain polyester fibers, rayon fibers and glass fibers (column 8, lines 24-29) and reads on binding the fibrous and/or granular substrates. The water-borne formaldehyde-free composition after it is applied to a nonwoven is heated to affect drying and curing (column 8, lines 42-43). The heat resistant nonwovens may be used for applications such as insulation batts or rolls, as reinforcement scrim in cementitious and non-cementitious coatings for masonry (column 8, lines 61-67). The binder is used in amounts of 28% by weight based on the weight of glass i.e. glass fiber (column 10, lines 13-14). It is the examiner's position that coating of the curable composition consisting of binder when cured would bind the fibrous and/or granular substrates such as polyester fibers, rayon fibers and glass fibers.

The formaldehyde free-curable aqueous composition may contain, in addition, conventional additives such as emulsifiers, pigments, curing agents, plasticizers, biocides, waxes and antioxidants (col. 6, lines 52-57).

Arkens et al fail to disclose impregnating and/or coating fibrous and/or granular substrates with polymerizable mixture comprising multifunctional macromonomer having a polymerizable content of free-radically polymerizable unsaturated group and a polymerization initiator; and amount of thermally polymerizable mixture used in the impregnation of fibrous and/or granular substrate.

However, Arkens et al teach in the general disclosure use of curable aqueous composition as a binder for heat resistant nonwoven fabrics such as certain polyester fibers, rayon fibers and glass fibers; and polymerization of reaction mixture to form the addition polymer. Instant invention also discloses that it is known in the prior art to impregnate fiber materials with prepolymers and then complete addition polymerization (page 1, lines 39-43). Therefore, it would have been obvious to coat/impregnate the substrate with polymerizable mixture of Arkens et al prior to complete polymerization (i.e. polymerizable mixture comprises polymerization initiator and multifunctional macromonomer having a polymerizable content of at least one free-radically polymerizable unsaturated group), because it is well known from prior art that fiber materials can be impregnated with prepolymers (i.e. reads on multifunctional macromonomer) and Arkens et al teach coating a substrate such as certain polyester fibers, rayon fibers and glass fibers with a binder material, as well as the polymerization of binder material and one of ordinary skill in the art would expect polymerization to work after coating/impregnating the substrate with polymerizable mixture consisting of the prepolymer and polymerization initiator, absent evidence of unexpected results. Court

held that selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results. See also *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946).

With respect to the amount of thermally polymerizable mixture used in impregnation of fibrous and/or granular substrate, it is the examiner's position that impregnation of substrate with thermally polymerizable mixture in amounts of from 2 to 35% by weight and 5 to 25% by weight is dependent on adhesion desired and the fibrous and/or granular nature of substrate and is within the scope of one skilled in the art, absent evidence of unexpected results.

5. Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Arkens et al* (US 5, 661, 213) in view of *Rockrath et al* (US 6, 835, 420 B1).

The discussion with respect to *Arkens et al* in paragraph 4 above is incorporated herein by reference. Furthermore, the composition can comprise a polyacid containing at least two carboxylic acid groups or the salts thereof and a highly reactive polyol containing at least two hydroxyl groups wherein the ratio of the number of equivalents of said carboxylic groups, anhydride groups or salts thereof to the number of equivalents of said hydroxyl groups is from about 1/0.01 to about 1/3 (column 7, lines 18-26) and reads on the percentages of claim 15. The polymerization reaction to prepare addition polymer may be initiated by thermal decomposition of an initiator (column 5, lines 6-8).

*Arkens et al* is silent with respect to reacting the product obtained with at least one epoxy compound and subsequently reacting with polyisocyanate; and the polymerization initiator.

However, Rockrath et al teach binding agent comprising two functional groups which can enter into crosslinking reactions with complimentary functional groups in crosslinking agent (abstract). For thermally sensitive substrates it is advantageous to choose a temperature range which does not exceed 100°C. In view of these temperature conditions, hydroxyl groups and isocyanate groups or carboxyl and epoxy groups have proven advantageous as complimentary functional groups (column 8, lines 54-59). Therefore, in light of the teachings in Rockrath et al, it would have been obvious to one skilled in art at the time invention was made to add polyisocyanate as a crosslinking agent to the binder of Arkens et al after reacting with epoxy crosslinker because the binder of Arkens et al comprises both carboxyl and hydroxyl groups and Rockrath et al have proven successfully that carboxyl and epoxy or hydroxyl and isocyanate are advantageous as complimentary functional groups in the binder for curing at low temperatures and one of ordinary skill in the art would expect such crosslinkers to work for the binder of Arkens et al, motivated by expectation of success.

With respect to polymerization initiator, Rockrath et al further teach that, as copolymerization initiator it is preferred to use initiators which form free radicals such as dialkyl peroxides, azobisisobutyronitrile and others (column 10, lines 66-67; column 11, lines 1-12). The strength and amount of initiator are customarily chosen in such a way that the supply of free radicals is constant. Therefore, in light of the teachings in Rockrath et al, it would have been obvious to one skilled in art at the time of invention to use the free radical initiators of Rockrath et al in an amount (as in present claims) that provides constant supply of free radicals during polymerization because Arkens et al contemplate using thermal initiator, known in the art, during polymerization of addition polymer and Rockrath provides list of thermal initiators that can be used in amounts that

generate constant supply of free radicals during polymerization, motivated by expectation of success.

6. Claims 10-11, 13-14, 17-18 and 20-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rockrath et al (WO 01/12736).

It is noted that WO 01/12736 (WO) is being utilized for date purposes. However, the US equivalent for WO, namely, Rockrath et al (US 6, 835, 420 B1) is referred to in the body of rejection below. All column and line citations are to the US equivalent.

Rockrath et al disclose a coating material which contains binding agent comprising two functional groups which can enter into crosslinking reactions with complimentary functional groups in crosslinking agent. The binding agent contains in an integrally polymerized form, at least one olefinically unsaturated polysiloxane macromonomer which contains at least 3.0 double bonds per molecule (abstract). Examples of crosslinking agents (B) disclosed do not include monomers but are polymeric in nature i.e. polyisocyanates, polyepoxides (col. 2, lines 38-41). Examples of suitable binders include acrylate copolymers (column 9, lines 12-15). Preferred acrylate copolymers (column 9, line 28) prepared by polymerizing polysiloxane macromonomer i.e. m3 (column 9, line 38) have a number average molecular weight of from 1500 to 10,000 (column 9, lines 48-49) and reads on multifunctional macromonomer and its molecular weight in present claims. The olefinically unsaturated double bonds of the polysiloxane macromonomers for inventive use are present in acrylic, methacrylic, vinyl, and/or allyl groups (column 7, lines 21-22). The monomer mixture is polymerized with one or more polymerization initiators (column 10, lines 61-63) and includes dialkyl peroxides, t-butyl perethylhexanoate and azobisisobutyronitrile (column 11, lines 5-11).



Suitable substrates include glass fibers, textiles, wood, leather, building material and rock wool (column 19, lines 33-40).

See example 1, wherein the coating composition comprises hexaacrylate-functional polysiloxane macromonomer in the monomer mixture and initiator solution of t-butyl perethylhexanoate in amount of about 2% by weight relative to the monomer content (column 24, lines 16-44). Binder contains on average more than 3.0 double bonds per molecule, a fraction of up to 15% by weight and preferably up to 2% by weight, based on the binder (column 7, lines 59-63) which reads on double bond content and polymerizable mixture. The polymerization takes place at temperatures between 100 and 160°C (column 10, lines 64-65). Higher crosslinking temperatures may be employed and include temperatures of from 100°C to 180°C (column 8, lines 66-67). It is the examiner's position that coating composition consisting of binding agent and thermal initiators when cured would bind the fibrous and/or granular substrates such as glass fibers, textiles, wood, leather, building material and rock wool. The coating material may further comprise at least one additive selected from polymerization inhibitors, emulsifiers and filler (col. 17, lines 57-67; col. 18, lines 1-51).

Rockrath et al is silent with respect to polymerizable mixture comprising radical polymerization initiator; impregnating the substrate with thermally polymerizable mixture and its amount.

However, Rockrath in the general disclosure teaches that the coating material may comprise at least one thermal crosslinking initiator (E). These initiators form free radicals which start the crosslinking reaction i.e. curing of the coating composition. Examples of thermal free-radical initiators are organic peroxides, peroxide esters and hydroperoxides, azo dinitriles in amounts of from 0.1 to 10% (col. 16, lines 19-27) which

read on the free radical polymerization initiator of instant claims. Thermal curing takes place at temperatures of up to about 180°C if the substrates used have high thermal load bearing capacity (col. 21, lines 28-42). Therefore, it would have been obvious to one skilled in art at the time invention was made to add the thermal initiator, such as organic peroxides, to the coating composition consisting of acrylate polymer binder having about 3.0 double bonds per molecule because Rockrath teaches in the general disclosure that initiators which generate free-radicals can be used for thermally curing the coating composition consisting of binding polymer having 3.0 double bonds and one skilled in art at the time invention was made would expect addition of free radical initiators to the coating composition, under thermal curing conditions, to polymerize the double bonds of acrylic polymer.

With respect to impregnation of substrate with thermally polymerizable mixture and its amount, it is the examiner's position that impregnation of substrate with thermally polymerizable mixture in amounts of from 2 to 35% by weight and 5 to 25% by weight is dependent on adhesion desired and the fibrous and/or granular nature of substrate and is within the scope of one skilled in the art, absent evidence of unexpected results.

### ***Response to Arguments***

7. The rejections under 35 U.S.C. 112 Second paragraph as set forth in paragraphs 3 in the preceding office action mailed 7/21/2009 are hereby overcome in light of the amendments and applicant's arguments filed 10/21/2009.

8. Applicant's arguments filed 10/21/2009 have been fully considered but they are not persuasive. Specifically, applicant argues that (A) Arkens polymer does not contain a polymerizable content of polymerizable unsaturated groups; (C) persons of ordinary skill in the art would not have added free-radical initiators to Arkens curable composition because neither Arkens polyacids nor its polyols are said to contain a polymerizable content of free-radically polymerizable unsaturated group; (D) Rockrath's coatings are formulated for application to surfaces formed of fiber composites or fiber re-inforced plastics and do not penetrate or coat fibrous and/or granular substrates; (E) there is no suggestion in Rockrath that functional groups (a1) and (b1) (see Table in col. 8) which are able to undergo thermal crosslinking are double bonds; (F) Rockrath teaches away from the polymerization and/or crosslinking temperatures required for thermal polymerization; (G) Rockrath instructs that the thermally curable coating must further contain a crosslinking agent with complimentary functional groups for curing. The content of polymerizable unsaturated functional groups available in Rockrath's binder for crosslinking and effective curing after being polymerized does not appear to be either adequate or feasible for effective crosslinking and curing; (H) there is no factual basis in Rockrath for the finding that binder contains unpolymerized polysiloxane macromonomer having a polymerizable content of free-radically polymerized unsaturated groups;

With respect to (A), applicant's attention is drawn to rejection set forth in paragraph 4 above, wherein *Graham v. Deere* analysis was done and the motivation to impregnate with a prepolymer (i.e. multifunctional macromonomer having a polymerizable content of polymerizable unsaturated groups) and subsequent polymerization using polymerization initiators is known from admitted prior art.

With respect to (C), given that it is known in prior art to impregnate the fibers with prepolymer (having polymerizable content of polymerizable unsaturated groups) and then polymerize in the presence of initiators, it is the examiner's position that impregnation of fibers with a prepolymer of Arkens and a polymerization initiator with subsequent polymerization is within the scope of one skilled in art, absent evidence of unexpected results.

With respect to (D), applicant's attention is drawn to Rockrath et al (col. 19, lines 33-40) wherein it states that composition of Rockrath can be applied to granular and fibrous substrates such as wood, leather, building material and rock wool. Instant claims only require that the granular or fibrous substrate be coated or impregnated.

With respect to (E), applicant's attention is drawn to  $-O-CR=CH_2$ ,  $-O-C(O)-CR=CH_2$ , and  $-CH=CH_2$  all of which contain polymerizable unsaturated double bonds.

With respect to (F), applicant's attention is drawn to Rockrath et al (col. 89, lines 66-67) wherein it states -higher crosslinking temperatures can be used and includes temperatures of from  $100^{\circ}C$  to  $180^{\circ}C$  (i.e. overlaps with the instantly claimed temperature).

With respect to (G), instant claims only require that the multifunctional macromonomer contain polymerizable content of at least one free-radically polymerizable unsaturated group. The binding agent, of Rockrath et al, contains at least one olefinically unsaturated polysiloxane macromonomer which contains at least 3.0 double bonds per molecule.

With respect to (H), applicant's attention is drawn to Rockrath et al (col. 7, lines 59-66) wherein it states – owing to the high functionality of on average more than 3.0 double bonds per molecule, a fraction of up to 5% by weight based in each case on the

binder (A) is sufficient. In addition, crosslinking agent added (for curing), to the binder containing multifunctional macromonomer, also contain double bonds in  $-\text{O}-\text{CR}=\text{CH}_2$ ,  $-\text{O}-\text{C}(\text{O})-\text{CR}=\text{CH}_2$ , and  $-\text{CH}=\text{CH}_2$ . Hence, it is the examiner's position that the multifunctional macromonomer of Rockrath indeed contains polymerizable content of at least one free-radically polymerizable unsaturated group.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KARUNA P. REDDY whose telephone number is (571)272-6566. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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